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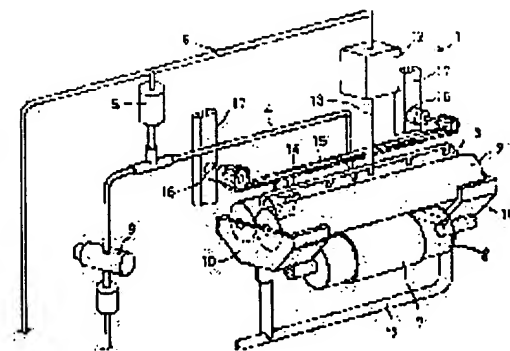
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(54) PRINTER AND RECOVERING METHOD FOR ITS INK

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce a cost of printing, to prevent public pollution and to simplify waste liquid disposal by suppressing ink loss by efficiently recovering residual ink.

SOLUTION: In the printer 1 comprising recovering mechanisms 10, 11 for recovering ink retained between a pair of rolls 2 and 3 in contact with each other, and cleaning mechanism 4, 5, 6 for cleaning the rolls 2, 3 by pouring cleanser between the rolls 2 and 3, means 12, 13 for supplying dilute liquid between the rolls 2 and 3 before cleaning the rolls 2, 3 by the mechanism 4, 5, 6 are provided. An amount of the dilute liquid from the means 12, 13 is specified to be reused when ink removed from the rolls 2, 3 is recovered by the mechanism 10, 11.



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CLAIMS

[Claim(s)]

[Claim 1] In the printing machine equipped with the recovery device in which the ink which collects between the rolls of the pair which meets mutually is collected, and the soaping-machine style which washes this roll A means to supply a diluent between the above-mentioned rolls in advance of the above-mentioned roll washing is established. The printing machine characterized by for the diluent from this supply means having removed ink from the roll surface, making it the above-mentioned recovery device recover, and prescribing that the amount of the diluent from the above-mentioned supply means becomes the concentration which can reuse the collected ink.

[Claim 2] The printing machine according to claim 1 characterized by preparing SUKUREPA which rakes out the ink which slid along with the above-mentioned roll and collected between the above-mentioned rolls, or the diluted ink.

[Claim 3] The printing machine according to claim 1 or 2 characterized by equipping the above-mentioned supply means with the metering zone which specifies the amount of supply of the diluent of a between [the above-mentioned rolls], and two or more feed hoppers.

[Claim 4] The recovery approach of ink which collect in the diluted ink which only the amount used as the concentration which can reuse when those removed ink is collected supplies the diluent which removes ink from each roll surface, is removed after this, and collects between rolls between that roll while collect the ink which collected between the rolls which stop in the condition met mutually and rotating each roll mutually after this.

[Claim 5] The recovery approach of the ink according to claim 4 characterized by collecting the ink which collected between the above-mentioned rolls, or the diluted ink by sliding SUKUREPA along with a roll.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the printing machine which can collect ink efficiently at the time of a color substitute.

[0002]

[Description of the Prior Art] Conventionally, there are some which were indicated by JP,63-77736,A in the flexographic press for for example, corrugated paper sheets. As shown in drawing 4 , this flexographic press is made to flow out of the both ends of rolls 2 and 3, and receives the ink which collected between the anilox roll 2 and the doctor rolls 3 which meet

mutually with a pan 10, and is collecting and reusing it to the ink container 21 through an exhaust pipe 11.

[0003] Moreover, the feed pipe 22 is connected with the ink supply pipe 4 which supplies the ink pulled up from the ink container 21 to between a roll 2 and 3 through the solenoid valve 5 with the pump 9, and this flexographic press 20 is made to perform washing of rolls 2 and 3 and a pan 10, an exhaust pipe 11, and the ink supply pipe 4 by opening a solenoid valve 5 wide, pouring water so much to the ink supply pipe 4, and pouring water between a roll 2 and 3.

[0004] In case this washing is performed, abandonment processing of the water with which the lower limit of the ink supply pipe 4 and an exhaust pipe 11 was already removed from the ink container 21, was located above the bucket 23, and washing was presented, and the extant ink will be discharged and carried out to a bucket 23.

[0005] Furthermore, SUKUREPA 14 which rakes out the ink which this flexographic press 20 slid along with rolls 2 and 3 besides [above] the recovery device of ink and the soaping-machine style of rolls 2 and 3, and collected between a roll 2 and 3 to the end pan 10 is formed, and speed-ization of ink recovery and roller washing is attained.

[0006]

[Problem(s) to be Solved by the Invention] By the way, when each die length of the anilox roll 2 in a flexographic press 20 and a doctor roll 3 is 2500mm, each path is 240mm and it is flexo ink of the usual viscosity, the coating weight of the ink which remains to these rolls 2 and three peripheral faces at the time of the ink recovery by color substitute is 25-30 cc and about 30-40 cc, respectively.

[0007] while [moreover, / 90 seconds] the ink which had collected between anilox roll 2 and a doctor roll 3 is color substitute time amount -- and -- pan -- as shown in drawing 5, when the ink which still remains even if it is after carrying out a natural outflow to 10 is set to height [from the contact of rolls 2 and 3 to an ink top face] H, it is about $H = 40\text{mm}$ and the amount of survival of this ink is about 470 cc.

[0008] Therefore, if it doubles with the amount of the ink which remains to each peripheral face of rolls 2 and 3, abandonment processing will be carried out with wash water, and the ink of 525-540 cc (about 525-540g) extent will serve as generating of an ink loss. This ink loss will increase, if the viscosity of ink becomes high.

[0009] Moreover, if it rakes out by SUKUREPA 14 and ink is collected, considerably, although an improvement can be aimed at, completely, completely it will collect, and it cannot be removed, and will serve as generating of the ink loss of 150 cc (about 150g) extent.

[0010] As mentioned above, in recovery of the conventional ink in a printing machine, since at least 150 cc ink loss occurred for every color substitute, the inclination of limited production with a wide variety progressed, it became a remarkable ink loss per day, and there was a problem that printing cost increased now [when a color substitute is frequently performed with exchange of a printing die for corrugated fibreboard etc.].

[0011] Moreover, there was also a problem that cause a public nuisance since a lot of ink is discharged with wash water, or the equipment and costs for performing waste fluid processing increased.

[0012] Then, this invention makes it a technical problem to reduce the equipment and costs for reducing an ink loss remarkably, preventing a public nuisance, and waste fluid processing by collecting ink more efficiently.

[0013]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this

invention established a means supplied a diluent between rolls in advance of washing of the roll by the soaping-machine style, removed ink from the roll surface with the diluent from this supply means, and collected it by the recovery device, and it was prescribed that the amount of the diluent from the above-mentioned supply means became the concentration which can reuse the collected ink.

[0014] In the printing machine concerning this invention, while the diluent from a supply means removes and recovers the ink of a roll surface, since it has prescribed that the amount of the diluent from this supply means becomes the concentration which can reuse the collected ink, compared with a natural outflow like before, or recovery of the ink of SUKUREPA twisted for raking out, an ink loss reduces it remarkably.

[0015] Moreover, recovery of ink will be quickened if SUKUREPA which drains off the ink which slid along with the roll and collected between rolls, and a diluent is prepared.

[0016] Furthermore, the above-mentioned supply means has adopted the configuration equipped with the metering zone which specifies the amount of supply of a diluent, and two or more feed hoppers.

[0017] The diluted ink [collect / supply, and only the amount used as the concentration which can reuse the diluent which removes ink from each roll surface between that roll when those removed ink is collected is removed after this, and / between rolls] made collect, collecting the ink which collected between the rolls which stop in the condition met mutually, as the recovery approach of ink on the other hand, and rotating each roll mutually after this.

[0018] In the ink recovery approach concerning this invention, since he is trying to become the concentration which can reuse the ink in which it removed the diluent, you may make it collect the ink of the roll surface which remains, rotating a roll, and the amount of that diluent also collected it after collecting the ink during a roll by SUKUREPA, compared with the former, an ink loss decreases by two steps of this recovery.

[0019] In addition, water is sufficient as the diluent said here, and an organic solvent is sufficient as it. What is necessary is just the liquid which can dilute each ink in short according to the ink of various classes.

[0020]

[Embodiment of the Invention] One gestalt of operation of the printing machine concerning this invention and the ink recovery approach is explained based on an accompanying drawing.

[0021] The flexographic press 1 shown in drawing 1 is equipped with the anilox roll 2 and the doctor roll 3 which meet mutually, the ink supply pipe 4 which supplies ink among these rolls 2 and 3, and the feed pipe 6 connected with this ink supply pipe 4 through the solenoid valve 5.

[0022] Anilox roll 2 and a doctor roll 3 rotate in the condition of the drive drive having been carried out and on the other hand having touched mutually from the edge side. For this reason, this flexographic press 1 does not have a drive in the another side edge side of rolls 2 and 3, and ~~it is easy for an operator to do predetermined~~ actuation of exchange of an ink container etc.

[0023] Moreover, the printing cylinder 8 which supports a printing die for corrugated fibreboard 7 in the shape of a roll under the anilox roll 2 so that this anilox roll 2 may be touched is formed.

[0024] As the ink supply pipe 4 is shown in drawing 1 and drawing 2, the tip is located above rolls 2 and 3 and supplies the ink sucked up with the pump 9 from the ink container among rolls 2 and 3. Moreover, the end pan 10 of the pair caught when the ink supplied from the ink supply pipe 4 is overflowed is formed in the both ends of rolls 2 and 3. The exhaust pipe 11 connected free [attachment and detachment] to an ink container is connected with this end pan 10, and he is trying to return the ink in pan 10 to an ink container through this exhaust pipe 11.

[0025] The feed pipe 6 is connected to the water source of supply which is not illustrated, and the measuring unit 12 which measures and collects the water from this water source of supply is formed in the point. Moreover, the supply pipe 13 equipped with the feed hopper which carries out five-place opening in the upper part of rolls 2 and 3 is connected to this measuring unit 12.

[0026] The measuring unit 12 is accumulated in the interior by using as a diluent the water of the amount (200 cc) set up beforehand, and makes this collected water flow into a supply pipe 13 according to the directions from a timing sequencer (not shown). And an intravenous drip injection is given to the water of the specified quantity which flowed out between the sequential roll 2 under low-speed rotation, and 3 from the feed hopper of a supply pipe 13, and it dilutes the ink of a roll 2 and three front faces.

[0027] As shown in drawing 1 and drawing 2, between anilox roll 2 and a doctor roll 3, SUKUREPA 14 made from urethane is located by the shape of a point sharp-pointed form which meets the peripheral face of these rolls 2 and 3 exactly, and this SUKUREPA 14 is attached in the flat belt 15 which meets in the die-length direction of rolls 2 and 3. This flat belt 15 slides SUKUREPA 14 along with rolls 2 and 3 by attaching those both ends in the revolving shaft of the drive motor 16 of a pair, and rolling them round with this drive motor 16. The frame 17 of a movable pair is fixed in the vertical direction, respectively, and a drive motor 16 makes it go up and down SUKUREPA 14 to rolls 2 and 3, and is made to detach and attach, when this frame 17 moves up and down.

[0028] As for this flexographic press 1, ink is always supplied from the ink supply pipe 4 between anilox roll 2 and a doctor roll 3 during printing. Homogeneity adheres to this supplied ink to anilox roll 2 with the doctor roll 3 which rotates to hard flow at a rate slightly later than the rotational speed of anilox roll 2, and it is transferred to the printing die for corrugated fibreboard 7 of a printing cylinder 8 which rotates from the front face of this anilox roll 2 to hard flow at the same rate as a roll 2. And predetermined printing is performed by contacting, while a corrugated paper sheet runs to the printing die for corrugated fibreboard 7 which this ink transferred. During this printing, SUKUREPA 14 is located in the drive side edge section upper part of rolls 2 and 3, where a rise of a frame 17 is always isolated from rolls 2 and 3. Moreover, when ink overflows from a roll 2 and three both ends during printing, this overflowing ink is returned to an ink container through an exhaust pipe 11 from the end pan 10, and is again used for printing.

[0029] On the other hand, when a certain printing needs to be completed and the color substitute by the following ink needs to be performed, the ink which adhered to rolls 2 and 3 in the way shown in the flow chart of drawing 3 is collected. A series of actuation in the flexographic press 1 required for this recovery is controlled by the timing sequencer unitary.

[0030] In addition, at the time of a color substitute, anilox roll 2 will be in the condition of carrying out free rotation, and a doctor roll 3 will be in the condition that drive rotation is carried out more extremely than the time of printing operation with a low speed. Therefore, anilox roll 2 will rotate with a low speed by contact to a doctor roll 3.

[0031] First, if the recovery command of the ink by color substitute is emitted by the timing sequencer (S1), this timing sequencer will stop a doctor roll 3 and anilox roll 2 (S2). And by moving a frame 17 below, SUKUREPA 14 is dropped (S3) and this SUKUREPA 14 is forced that there is no clearance in the peripheral face of the drive side edge section of rolls 2 and 3.

[0032] Subsequently, make it slide to (OP) a left-hand side actuation side from the driving side on the right-hand side of drawing 1 of rolls 2 and 3 (DR), where SUKUREPA 14 is forced on rolls 2 and 3 (S4), it is made to stop in the actuation side edge section of rolls 2 and 3 (S5), and a

roll 2 and the ink which collected among three are raked out to the end pan 10. These raked-out ink is collected from the end pan 10 by the ink container through an exhaust pipe 11. And SUKUREPA 14 is raised (S6) and SUKUREPA 14 is made to isolate from rolls 2 and 3 by moving a frame 17 upwards.

[0033] Then, carrying out low-speed rotation of a doctor roll 3 and the anilox roll 2, an intravenous drip injection is given between a roll 2 and 3 in 200 cc water through two or more feed hoppers of a supply pipe 13 from the measuring unit 12 (S8), and ink is removed from a roll 2 and three front faces (S7). The removed ink is thinned with the water to which an intravenous drip injection was given, and collects between a roll 2 and 3. Moreover, coincidence is moved to ~~a driving-side from an actuation-side in the condition of having made SUKUREPA 14 isolating from rolls 2 and 3 (S9), and is stopped in the drive side edge section upper part of rolls 2 and 3 (S10).~~

[0034] Covering full [of rolls 2 and 3], since an intravenous drip injection is given to the water of the amount of conventions from two or more feed hoppers of a supply pipe 13, homogeneity and since it is supplied quickly, ink is efficient from the peripheral face of rolls 2 and 3 to a short time, and water is removed.

[0035] And after stopping a doctor roll 3 (S11), move a frame 17 below and SUKUREPA 14 is again forced on the peripheral face of the drive side edge section of rolls 2 and 3 (S12). This SUKUREPA 14 is again slid from the drive side edge section of rolls 2 and 3 to the actuation side edge section (S13), the ink diluted with a roll 2 and the water which collected among three is raked out to the end pan 10, and the actuation side edge section of rolls 2 and 3 is made to stop SUKUREPA 14 (S14). It is based under water intravenous drip supply and on SUKUREPA 14, and rakes out, and dilution ink is collected from the end pan 10 through an exhaust pipe 11 to an ink container at inside. Since the ink adhering to the inside of the pan 10 at this time and an exhaust pipe 11 is also removed and collected by coincidence with water, the amount of recovery of ink increases, when it exchanges for the ink of the following color, there is no mixture of the color of ink, and it is convenient.

[0036] In addition, since SUKUREPA 14 is slid from a driving side to an actuation side, dilution ink is collected and it does not go via the exhaust pipe 11 with the great portion of dilution ink long in the case of the operation gestalt of drawing 1 collected, recovery time amount is short
*****.

[0037] It is specified that it becomes the concentration which the collected ink can reuse within an ink container when the ink of a roll 2, three front faces, or exhaust pipe 11 grade is removed and collected although the water amount to which an intravenous drip injection is given changes with the class of ink, viscosity or the magnitude of rolls 2 and 3, etc., and it is satisfactory even if it returns the removed ink to an ink container. Thus, after the ink which remains is almost lost, by moving a frame 17 upwards, SUKUREPA 14 is raised again (S15), a doctor roll 3 and anilox ~~roll 2 are rotated, and it shifts to a washing process (S16). Moreover, move SUKUREPA 14~~ which raised coincidence to a driving side from an actuation side (S17), and it is made to stop in the drive side edge section upper part of rolls 2 and 3 (S18), and prepares for the next actuation.

[0038] At a washing process, a solenoid valve 5 is wide opened in the condition that rolls 2 and 3 are rotating, a lot of water is supplied to the ink supply pipe 4 as a penetrant remover from a feed pipe 6, and the ink supply pipe 4, rolls 2 and 3, a pan 10, and an exhaust pipe 11 are washed. After being discharged by the bucket, abandonment processing of the water with which each lower limit section of the ink supply pipe 4 and an exhaust pipe 11 was removed from the ink container, and was located above the bucket at this time, and washing was presented will be

carried out.

[0039] In addition, the water of the amount of conventions is divided into 2 times, intravenous drip supply is carried out, and you may make it collect ink. In this case, raising water by (S8) and raising SUKUREPA by (S6) during intravenous drip supply The SUKUREPA 14 is not moved to a driving side (DR) from (OP) an actuation side by (S9). What is necessary is just to perform ink recovery of a two-times eye using the migration from the driving side of SUKUREPA 14 to an actuation side, after performing first ink recovery and carrying out intravenous drip supply of the water similarly again by making it move once it drops SUKUREPA 14.

[0040] Under the present circumstances, SUKUREPA 14 goes up during rotation of a doctor roll 3 and anilox roll 2, and descends during the ink recovery by sliding.

[0041] The rolls 2 and 3 of the conditions shown in the column of above-mentioned [Problem(s) to be Solved by the Invention] were used, when the effectiveness of the flexographic press 1 concerning this invention was examined, most ink adhering to the inside of the front face of rolls 2 and 3, the end pan 10, and an exhaust pipe 11 could be collected altogether, and the ink loss was able to be made about into about zero.

[0042] Therefore, it is as follows when the frame of the cost cut per moon is computed on conditions as shown below.

1. Conditions (1) 3 color flexographic press which can print to coincidence the unit shown in drawing 1 to 3 unit preparation ***** and three colors is used.

(2) Let the averages of the color number of printing per time needed for the corrugated paper sheet by order of a customer be 1.7 colors.

(3) Make it into 30 times, the frequency of recoloring, i.e., the count, per [which performs different printing] day.

(4) Make the operation day per month into 22 days.

(5) Indicate in the column of the ink loss per day in the conventional flexographic press [Object of the Invention].

** When not using SUKUREPA and 540g ** SUKUREPA of :abbreviation is used : the frame of an about 150g2. cost cut (an ink unit price is carried out in 710 yen/kg.)

(1) When it compares with the conventional flexographic press which does not use SUKUREPA, it is $1.7(\text{color/time}) \times 30(\text{time}) \times 0.54(\text{kg}) \times 710(\text{yen/kg}) \times 22(\text{day/month})$ **43 (10,000 yen).

(2) When it compares with the conventional flexographic press which uses SUKUREPA, it is $1.7(\text{color/time}) \times 30(\text{time}) \times 0.15(\text{kg}) \times 710(\text{yen/kg}) \times 22(\text{day/month})$ **12 (10,000 yen).

[0043] Moreover, since this flexographic press 1 does not almost have an ink residue, water amount and washing time amount with which washing in a washing process is presented can be reduced. A cost cut can be aimed at also from this point.

[0044] Although [the gestalt of this operation] the water as a penetrant remover and the water as a diluent are supplied from the same feed pipe, a separate liquid supply device is prepared in each, and you may make it supply a penetrant remover and the diluent of each other uniquely.

[0045] Moreover, although recovery of a roll 2, the ink which collects among three, or the diluted ink is based on above-mentioned SUKUREPA 14, the blast pipe which turned the ventilation section to the upper part location of others and rolls 2 and 3 below can be arranged, a negative-pressure device can be prepared in the approach and the exhaust pipe 11 which make ink discharge with the wind pressure from ventilation opening, and the approach of discharging ink using the suction force etc. can use the means of arbitration.

[0046]

[Effect] From being constituted as mentioned above, since the recovery approach of a printing

machine and ink concerning this invention can reduce an ink loss remarkably compared with the former, it can contribute to reduction of the cost concerning printing greatly.

[0047] Moreover, the equipment for prevention of the public nuisance by waste fluid and waste fluid processing and reduction of costs can also be aimed at.

[0048] Furthermore, in preparing SUKUREPA and collecting ink, the effectiveness of ink recovery improves more.

[0049] And when the supply means of a diluent is equipped with two or more feed hoppers, ink recovery can carry out in a short time efficiently.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the printing machine which can collect ink efficiently at the time of a color substitute.

PRIOR ART

[Description of the Prior Art] Conventionally, there are some which were indicated by JP,63-77736,A in the flexographic press for for example, corrugated paper sheets. As shown in drawing 4, this flexographic press is made to flow out of the both ends of rolls 2 and 3, and receives the ink which collected between the anilox roll 2 and the doctor rolls 3 which meet mutually with a pan 10, and is collecting and reusing it to the ink container 21 through an exhaust pipe 11.

[0003] Moreover, the feed pipe 22 is connected with the ink supply pipe 4 which supplies the ink pulled up from the ink container 21 to between a roll 2 and 3 through the solenoid valve 5 with the pump 9, and this flexographic press 20 is made to perform washing of rolls 2 and 3 and a pan 10, an exhaust pipe 11, and the ink supply pipe 4 by opening a solenoid valve 5 wide, pouring water so much to the ink supply pipe 4, and pouring water between a roll 2 and 3.

[0004] In case this washing is performed, abandonment processing of the water with which the lower limit of the ink supply pipe 4 and an exhaust pipe 11 was already removed from the ink container 21, was located above the bucket 23, and washing was presented, and the extant ink will be discharged and carried out to a bucket 23.

[0005] Furthermore, SUKUREPA 14 which rakes out the ink which this flexographic press 20 slid along with rolls 2 and 3 besides [above] the recovery device of ink and the soaping-machine style of rolls 2 and 3, and collected between a roll 2 and 3 to the end pan 10 is formed, and speed-ization of ink recovery and roller washing is attained.

EFFECT OF THE INVENTION

[Effect] From being constituted as mentioned above, since the recovery approach of a printing machine and ink concerning this invention can reduce an ink loss remarkably compared with the former, it can contribute to reduction of the cost concerning printing greatly.

[0047] Moreover, the equipment for prevention of the public nuisance by waste fluid and waste fluid processing and reduction of costs can also be aimed at.

[0048] Furthermore, in preparing SUKUREPA and collecting ink, the effectiveness of ink recovery improves more.

[0049] And when the supply means of a diluent is equipped with two or more feed hoppers, ink recovery can carry out in a short time efficiently.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, when each die length of the anilox roll 2 in a flexographic press 20 and a doctor roll 3 is 2500mm, each path is 240mm and it is flexo ink of the usual viscosity, the coating weight of the ink which remains to these rolls 2 and three peripheral faces at the time of the ink recovery by color substitute is 25-30 cc and about 30-40 cc, respectively.

[0007] while [moreover, / 90 seconds] the ink which had collected between anilox roll 2 and a doctor roll 3 is color substitute time amount -- and -- pan -- as shown in drawing 5 , when the ink which still remains even if it is after carrying out a natural outflow to 10 is set to height [from the contact of rolls 2 and 3 to an ink top face] H, it is about H= 40mm and the amount of survival of this ink is about 470 cc.

[0008] Therefore, if it doubles with the amount of the ink which remains to each peripheral face of rolls 2 and 3, abandonment processing will be carried out with wash water, and the ink of 525-540 cc (about 525-540g) extent will serve as generating of an ink loss. This ink loss will increase, if the viscosity of ink becomes high.

[0009] Moreover, if it rakes out by SUKUREPA 14 and ink is collected, considerably, although an improvement can be aimed at, completely, completely it will collect, and it cannot be removed, and will serve as generating of the ink loss of 150 cc (about 150g) extent.

[0010] As mentioned above, in recovery of the conventional ink in a printing machine, since at least 150 cc ink loss occurred for every color substitute, the inclination of limited production with a wide variety progressed, it became a remarkable ink loss per day, and there was a problem that printing cost increased now [when a color substitute is frequently performed with exchange of a printing die for corrugated fibreboard etc.].

[0011] Moreover, there was also a problem that cause a public nuisance since a lot of ink is discharged with wash water, or the equipment and costs for performing waste fluid processing increased.

[0012] Then, this invention makes it a technical problem to reduce the equipment and costs for reducing an ink loss remarkably, preventing a public nuisance, and waste fluid processing by collecting ink more efficiently.

MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention established a means supplied a diluent between rolls in advance of washing of the roll by the soaping-machine style, removed ink from the roll surface with the diluent from this supply means, and collected it by the recovery device, and it was prescribed that the amount of the diluent from the above-mentioned supply means became the concentration which can reuse the collected ink.

[0014] In the printing machine concerning this invention, while the diluent from a supply means removes and recovers the ink of a roll surface, since it has prescribed that the amount of the diluent from this supply means becomes the concentration which can reuse the collected ink, compared with a natural outflow like before, or recovery of the ink of SUKUREPA twisted for

raking out, an ink loss reduces it remarkably.

[0015] Moreover, recovery of ink will be quickened if SUKUREPA which drains off the ink which slid along with the roll and collected between rolls, and a diluent is prepared.

[0016] Furthermore, the above-mentioned supply means has adopted the configuration equipped with the metering zone which specifies the amount of supply of a diluent, and two or more feed hoppers.

[0017] The diluted ink [collect / supply, and only the amount used as the concentration which can reuse the diluent which removes ink from each roll surface between that roll when those removed ink is collected is removed after this, and / between rolls] made collect, collecting the ink which collected between the rolls which stop in the condition met mutually, as the recovery approach of ink on the other hand, and rotating each roll mutually after this.

[0018] In the ink recovery approach concerning this invention, since he is trying to become the concentration which can reuse the ink in which it removed the diluent, you may make it collect the ink of the roll surface which remains, rotating a roll, and the amount of that diluent also collected it after collecting the ink during a roll by SUKUREPA, compared with the former, an ink loss decreases by two steps of this recovery.

[0019] In addition, water is sufficient as the diluent said here, and an organic solvent is sufficient as it. What is necessary is just the liquid which can dilute each ink in short according to the ink of various classes.

[0020]

[Embodiment of the Invention] One gestalt of operation of the printing machine concerning this invention and the ink recovery approach is explained based on an accompanying drawing.

[0021] The flexographic press 1 shown in drawing 1 is equipped with the anilox roll 2 and the doctor roll 3 which meet mutually, the ink supply pipe 4 which supplies ink among these rolls 2 and 3, and the feed pipe 6 connected with this ink supply pipe 4 through the solenoid valve 5.

[0022] Anilox roll 2 and a doctor roll 3 rotate in the condition of the drive drive having been carried out and on the other hand having touched mutually from the edge side. For this reason, this flexographic press 1 does not have a drive in the another side edge side of rolls 2 and 3, and it is easy for an operator to do predetermined actuation of exchange of an ink container etc.

[0023] Moreover, the printing cylinder 8 which supports a printing die for corrugated fibreboard 7 in the shape of a roll under the anilox roll 2 so that this anilox roll 2 may be touched is formed.

[0024] As the ink supply pipe 4 is shown in drawing 1 and drawing 2, the tip is located above rolls 2 and 3 and supplies the ink sucked up with the pump 9 from the ink container among rolls 2 and 3. Moreover, the end pan 10 of the pair caught when the ink supplied from the ink supply pipe 4 is overflowed is formed in the both ends of rolls 2 and 3. The exhaust pipe 11 connected free [attachment and detachment] to an ink container is connected with this end pan 10, and he is trying to return the ink in pan 10 to an ink container through this exhaust pipe 11.

[0025] The feed pipe 6 is connected to the water source of supply which is not illustrated, and the measuring unit 12 which measures and collects the water from this water source of supply is formed in the point. Moreover, the supply pipe 13 equipped with the feed hopper which carries out five-place opening in the upper part of rolls 2 and 3 is connected to this measuring unit 12.

[0026] The measuring unit 12 is accumulated in the interior by using as a diluent the water of the amount (200 cc) set up beforehand, and makes this collected water flow into a supply pipe 13 according to the directions from a timing sequencer (not shown). And an intravenous drip injection is given to the water of the specified quantity which flowed out between the sequential roll 2 under low-speed rotation, and 3 from the feed hopper of a supply pipe 13, and it dilutes the

ink of a roll 2 and three front faces.

[0027] As shown in drawing 1 and drawing 2, between anilox roll 2 and a doctor roll 3, SUKUREPA 14 made from urethane is located by the shape of a point sharp-pointed form which meets the peripheral face of these rolls 2 and 3 exactly, and this SUKUREPA 14 is attached in the flat belt 15 which meets in the die-length direction of rolls 2 and 3. This flat belt 15 slides SUKUREPA 14 along with rolls 2 and 3 by attaching those both ends in the revolving shaft of the drive motor 16 of a pair, and rolling them round with this drive motor 16. The frame 17 of a movable pair is fixed in the vertical direction, respectively, and a drive motor 16 makes it go up and down SUKUREPA 14 to rolls 2 and 3, and is made to detach and attach, when this frame 17 moves up and down.

~~[0028] As for this flexographic press 1, ink is always supplied from the ink supply pipe 4~~ between anilox roll 2 and a doctor roll 3 during printing. Homogeneity adheres to this supplied ink to anilox roll 2 with the doctor roll 3 which rotates to hard flow at a rate slightly later than the rotational speed of anilox roll 2, and it is transferred to the printing die for corrugated fibreboard 7 of a printing cylinder 8 which rotates from the front face of this anilox roll 2 to hard flow at the same rate as a roll 2. And predetermined printing is performed by contacting, while a corrugated paper sheet runs to the printing die for corrugated fibreboard 7 which this ink transferred. During this printing, SUKUREPA 14 is located in the drive side edge section upper part of rolls 2 and 3, where a rise of a frame 17 is always isolated from rolls 2 and 3. Moreover, when ink overflows from a roll 2 and three both ends during printing, this overflowing ink is returned to an ink container through an exhaust pipe 11 from the end pan 10, and is again used for printing.

[0029] On the other hand, when a certain printing needs to be completed and the color substitute by the following ink needs to be performed, the ink which adhered to rolls 2 and 3 in the way shown in the flow chart of drawing 3 is collected. A series of actuation in the flexographic press 1 required for this recovery is controlled by the timing sequencer unitary.

[0030] In addition, at the time of a color substitute, anilox roll 2 will be in the condition of carrying out free rotation, and a doctor roll 3 will be in the condition that drive rotation is carried out more extremely than the time of printing operation with a low speed. Therefore, anilox roll 2 will rotate with a low speed by contact to a doctor roll 3.

[0031] First, if the recovery command of the ink by color substitute is emitted by the timing sequencer (S1), this timing sequencer will stop a doctor roll 3 and anilox roll 2 (S2). And by moving a frame 17 below, SUKUREPA 14 is dropped (S3) and this SUKUREPA 14 is forced that there is no clearance in the peripheral face of the drive side edge section of rolls 2 and 3.

[0032] Subsequently, make it slide to (OP) a left-hand side actuation side from the driving side on the right-hand side of drawing 1 of rolls 2 and 3 (DR), where SUKUREPA 14 is forced on rolls 2 and 3 (S4), it is made to stop in the actuation side edge section of rolls 2 and 3 (S5), and a ~~roll 2 and the ink which collected among three are raked out to the end pan 10. These raked-out ink is collected from the end pan 10 by the ink container through an exhaust pipe 11. And~~ SUKUREPA 14 is raised (S6) and SUKUREPA 14 is made to isolate from rolls 2 and 3 by moving a frame 17 upwards.

[0033] Then, carrying out low-speed rotation of a doctor roll 3 and the anilox roll 2, an intravenous drip injection is given between a roll 2 and 3 in 200 cc water through two or more feed hoppers of a supply pipe 13 from the measuring unit 12 (S8), and ink is removed from a roll 2 and three front faces (S7). The removed ink is thinned with the water to which an intravenous drip injection was given, and collects between a roll 2 and 3. Moreover, coincidence is moved to

a driving side from an actuation side in the condition of having made SUKUREPA 14 isolating from rolls 2 and 3 (S9), and is stopped in the drive side edge section upper part of rolls 2 and 3 (S10).

[0034] Covering full [of rolls 2 and 3], since an intravenous drip injection is given to the water of the amount of conventions from two or more feed hoppers of a supply pipe 13, homogeneity and since it is supplied quickly, ink is efficient from the peripheral face of rolls 2 and 3 to a short time, and water is removed.

[0035] And after stopping a doctor roll 3 (S11), move a frame 17 below and SUKUREPA 14 is again forced on the peripheral face of the drive side edge section of rolls 2 and 3 (S12). This ~~SUKUREPA 14 is again slid from the drive side edge section of rolls 2 and 3 to the actuation side edge section (S13), the ink diluted with a roll 2 and the water which collected among three~~ is raked out to the end pan 10, and the actuation side edge section of rolls 2 and 3 is made to stop SUKUREPA 14 (S14). It is based under water intravenous drip supply and on SUKUREPA 14, and rakes out, and dilution ink is collected from the end pan 10 through an exhaust pipe 11 to an ink container at inside. Since the ink adhering to the inside of the pan 10 at this time and an exhaust pipe 11 is also removed and collected by coincidence with water, the amount of recovery of ink increases, when it exchanges for the ink of the following color, there is no mixture of the color of ink, and it is convenient.

[0036] In addition, since SUKUREPA 14 is slid from a driving side to an actuation side, dilution ink is collected and it does not go via the exhaust pipe 11 with the great portion of dilution ink long in the case of the operation gestalt of drawing 1 collected, recovery time amount is short

[0037] It is specified that it becomes the concentration which the collected ink can reuse within an ink container when the ink of a roll 2, three front faces, or exhaust pipe 11 grade is removed and collected although the water amount to which an intravenous drip injection is given changes with the class of ink, viscosity or the magnitude of rolls 2 and 3, etc., and it is satisfactory even if it returns the removed ink to an ink container. Thus, after the ink which remains is almost lost, by moving a frame 17 upwards, SUKUREPA 14 is raised again (S15), a doctor roll 3 and anilox roll 2 are rotated, and it shifts to a washing process (S16). Moreover, move SUKUREPA 14 which raised coincidence to a driving side from an actuation side (S17), and it is made to stop in the drive side edge section upper part of rolls 2 and 3 (S18), and prepares for the next actuation.

[0038] At a washing process, a solenoid valve 5 is wide opened in the condition that rolls 2 and 3 are rotating, a lot of water is supplied to the ink supply pipe 4 as a penetrant remover from a feed pipe 6, and the ink supply pipe 4, rolls 2 and 3, a pan 10, and an exhaust pipe 11 are washed. After being discharged by the bucket, abandonment processing of the water with which each lower limit section of the ink supply pipe 4 and an exhaust pipe 11 was removed from the ink container, and was located above the bucket at this time, and washing was presented will be carried out.

[0039] In addition, the water of the amount of conventions is divided into 2 times, intravenous drip supply is carried out, and you may make it collect ink. In this case, raising water by (S8) and raising SUKUREPA by (S6) during intravenous drip supply The SUKUREPA 14 is not moved to a driving side (DR) from (OP) an actuation side by (S9). What is necessary is just to perform ink recovery of a two-times eye using the migration from the driving side of SUKUREPA 14 to an actuation side, after performing first ink recovery and carrying out intravenous drip supply of the water similarly again by making it move once it drops SUKUREPA 14.

[0040] Under the present circumstances, SUKUREPA 14 goes up during rotation of a doctor roll

3 and anilox roll 2, and descends during the ink recovery by sliding.
[0041] Above

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The important section perspective view showing one gestalt of operation of the flexographic press of this invention

[Drawing 2] The side elevation from the end-face of a roller part

[Drawing 3] The flow chart which shows the ink recovery approach of this invention

[Drawing 4] The perspective view of the conventional flexographic press

[Drawing 5] The side elevation showing an ink residue

[Description of Notations]

1 Flexographic Press

2 Anilox Roll

3 Doctor Roll

4 Ink Supply Pipe

5 Solenoid Valve

6 22 Feed pipe

7 Printing Die for Corrugated Fibreboard

8 Printing Cylinder

9 Pump

10 And Pan

11 Exhaust Pipe

12 Measuring Unit

13 Supply Pipe

14 SUKUREPA

15 Flat Belt

16 Drive Motor

17 Frame

20 The Conventional Flexographic Press

21 21' Ink container

23 Bucket

[Translation done.]

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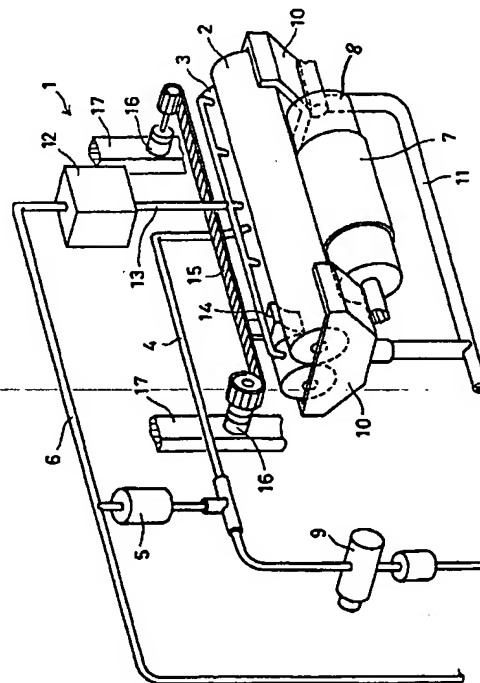
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(54) 【発明の名称】 印刷機及びそのインキの回収方法

(57) 【要約】

【課題】 残留インキを効率良く回収するようにすることによってインキロスを抑えて、印刷にかかるコストの削減と公害の防止と廃液処理の簡素化を図ること。

【解決手段】 互いに相接する一対のロール2、3の間に溜まるインキを回収する回収機構10、11と、このロール2、3間に洗浄液を注入してロール2、3を洗浄する洗浄機構4、5、6とを備えた印刷機1に、この洗浄機構4、5、6によるロール2、3の洗浄に先だって希釈液をロール2、3間に供給する手段12、13を設ける。供給手段12、13からの希釈液の量を、この希釈液でロール2、3から除去したインキを回収機構10、11で回収した場合に再利用可能となるよう規定する。



【特許請求の範囲】

【請求項1】 互いに相接する一対のロールの間に溜まるインキを回収する回収機構と、このロールを洗浄する洗浄機構とを備えた印刷機において、上記ロール洗浄に先だって希釈液を上記ロール間に供給する手段を設け、この供給手段からの希釈液でロール表面からインキを除去して上記回収機構により回収するようにし、上記供給手段からの希釈液の量を、回収されたインキが再利用可能な濃度となるように規定したことを特徴とする印刷機。

【請求項2】 上記ロールに沿って摺動して上記ロール間に溜まったインキ又は希釈されたインキを掻き出すスクレパーを設けたことを特徴とする請求項1に記載の印刷機。

【請求項3】 上記供給手段が、上記ロール間への希釈液の供給量を規定する計量部と複数の供給口とを備えていることを特徴とする請求項1または2に記載の印刷機。

【請求項4】 互いに相接した状態で停止するロール間に溜まったインキを回収し、この後各ロールを互いに回転させながら、そのロール間に、各ロール表面からインキを除去する希釈液を、その除去したインキを回収した場合に再利用可能な濃度となる量だけ供給し、この後除去されてロール間に溜まる希釈されたインキを回収する、インキの回収方法。

【請求項5】 上記ロール間に溜まったインキ又は希釈されたインキを、ロールに沿ってスクレパーを摺動させることによって回収することを特徴とする請求項4に記載のインキの回収方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、色替え時においてインキを効率良く回収できる印刷機に関する。

【0002】

【従来の技術】従来より、例えば段ボールシート用のフレキシ印刷機には、特開昭63-77736号公報に記載されたものがある。このフレキシ印刷機は、図4に示すように、互いに相接するアニロックスロール2とドクターロール3の間に溜まったインキを、ロール2、3の両端から流出させエンドパン10で受けて排出管11を通してインキ容器21へ回収し再利用している。

【0003】また、このフレキシ印刷機20は、ポンプ9でインキ容器21から引き上げたインキをロール2、3間へ供給するインキ供給管4に、電磁弁5を介して給水管22が連結されており、電磁弁5を開放しインキ供給管4に多量に水液を流してロール2、3間に注水することによって、ロール2、3、エンドパン10、排出管11及びインキ供給管4の洗浄を行うようにしている。

【0004】この洗浄を行う際には、インキ供給管4と排出管11の下端は、既にインキ容器21から外されて

バケット23の上方に位置しており、洗浄に供された水液と残存していたインキは、バケット23へ排出されて廃棄処理されることとなる。

【0005】さらに、このフレキシ印刷機20は、上記のようなインキの回収機構とロール2、3の洗浄機構の他に、ロール2、3に沿って摺動してロール2、3間に溜まったインキをエンドパン10へ掻き出すスクレパー14が設けられており、インキ回収とローラ洗浄のスピード化が図られている。

【0006】

【発明が解決しようとする課題】ところで、フレキシ印刷機20におけるアニロックスロール2とドクターロール3のそれぞれの長さが2500mm、それぞれの径が240mmであり、通常の粘度のフレキシインキであるとした場合、色替えによるインキ回収時にこれらのロール2および3外周面へ残存するインキの付着量は、それぞれ25～30ccおよび30～40cc程度である。

【0007】また、アニロックスロール2とドクターロール3との間に溜まっていたインキが、色替え時間である90秒の間にエンドパン10へ自然流出した後であってもまだ残存するインキは、図5に示すようにロール2、3の接点からインキ上面までの高さHとするとH=40mm程度であり、このインキの残存量は約470ccである。

【0008】従って、ロール2、3のそれぞれの外周面へ残存するインキの量と合わせると525～540cc（約525～540g）程度のインキが洗浄水と共に廃棄処理されることになり、インキロスの発生となる。このインキロスはインキの粘度が高くなると増大する。

【0009】また、スクレパー14で掻き出してインキの回収を行うと、かなり改善は図れるものの完全には回収、除去しきれず、150cc（約150g）程度のインキロスの発生となる。

【0010】以上のように、印刷機における従来のインキの回収においては、色替え毎に少なくとも150ccのインキロスが発生してしまうので、多品種少量生産の傾向が進んで、印版等の取替えと共に色替えが頻繁に行われる現在では、1日当たりかなりのインキロスとなつて、印刷コストが増大するという問題があった。

【0011】また、洗浄水と共に多量のインキが排出されるため公害を招いたり、廃液処理を行うための装置と費用がかさむという問題もあった。

【0012】そこで、この発明は、インキをより効率よく回収することによって、インキロスを著しく低減させること、公害を防止すること、および廃液処理のための装置と費用を削減することを課題とする。

【0013】

【課題を解決するための手段】上記の課題を解決するために、この発明は、洗浄機構によるロールの洗浄に先だって希釈液をロール間に供給する手段を設け、この供給

手段からの希釈液でロール表面からインキを除去して回収機構で回収するようにし、上記供給手段からの希釈液の量を、回収されたインキが再利用可能な濃度となるように規定した。

【0014】この発明に係る印刷機においては、ロール表面のインキを、供給手段からの希釈液で除去して回収すると共に、この供給手段からの希釈液の量を、回収したインキが再利用可能な濃度となるように規定しているので、従来のような自然流出やスクレパーの掻き出しによるインキの回収に比べて、著しくインキロスが低減する。

【0015】また、ロールに沿って摺動してロール間に溜まったインキや希釈液を掻き出すスクレパーを設けると、インキの回収が迅速化される。

【0016】さらに、上記供給手段が、希釈液の供給量を規定する計量部と複数の供給口とを備えた構成を採用している。

【0017】一方、インキの回収方法として、互いに相接した状態で停止するロール間に溜まったインキを回収し、この後各ロールを互いに回転させながら、そのロール間に、各ロール表面からインキを除去する希釈液を、その除去したインキを回収した場合に再利用可能な濃度となる量だけ供給し、この後除去されてロール間に溜まる希釈されたインキを回収するようにした。

【0018】この発明に係るインキ回収方法においては、スクレパーでロール間のインキを回収した後、残留するロール表面のインキを、ロールを回転させながら希釈液で除去して回収するようにしてもよく、その希釈液の量も、回収したインキが再利用可能な濃度となるようにしているので、この2段階の回収により従来に比べてインキロスが低減する。

【0019】なお、ここにいう希釈液は、水液でもよいし有機溶剤でもよい。要するに、様々な種類のインキに応じて各インキを希釈できるような液体であればよいのである。

【0020】

【発明の実施の形態】この発明に係る印刷機及びインキ回収方法の実施の一形態を添付図面に基づいて説明する。

【0021】図1に示すフレキシ印刷機1は、互いに相接するアニロックスロール2及びドクターロール3と、これらロール2、3の間にインキを供給するインキ供給管4と、このインキ供給管4に電磁弁5を介して連結された給水管6とを備えている。

【0022】アニロックスロール2とドクターロール3は、一方端部側からドライブ駆動されて互いに接した状態で回転するようにになっている。このため、このフレキシ印刷機1は、ロール2、3の他方端部側に駆動機構がなく、インキ容器の交換などの所定の操作をオペレータがし易くなっている。

【0023】また、アニロックスロール2の下方には、このアニロックスロール2に接するように印版7をロール状に支持する印刷シリンダ8が設けられている。

【0024】インキ供給管4は、図1及び図2に示すように、先端がロール2、3の上方に位置しており、インキ容器からポンプ9で吸い上げたインキをロール2、3の間に供給する。また、ロール2、3の両端には、インキ供給管4から供給したインキをオーバーフローした場合に受け止める一対のエンドパン10が設けられている。このエンドパン10には、インキ容器に対して着脱自在に接続される排出管11が連結されており、この排出管11を通してエンドパン10内のインキをインキ容器に戻すようにしている。

【0025】給水管6は、図示しない水液の供給源に接続されており、この水液供給源からの水液を計量して溜める計量ユニット12が、先端部に設けられている。また、この計量ユニット12には、ロール2、3の上方で5ヶ所開口する供給口を備えた供給管13が接続されている。

【0026】計量ユニット12は、予め設定された量（200cc）の水液を希釈液として内部に溜め、この溜めた水液をタイミングシーケンサ（図示せず）からの指示に従って供給管13に流出させる。そして、流出した所定量の水液は、供給管13の供給口から低速回転中の順次ロール2、3間に点滴されて、ロール2、3表面のインキを希釈する。

【0027】図1及び図2に示すように、アニロックスロール2とドクターロール3の間には、これらロール2、3の外周面にぴったりと沿う先尖形状でウレタン製のスクレパー14が位置しており、このスクレパー14は、ロール2、3の長さ方向に沿うフラットベルト15に取り付けられている。このフラットベルト15は、その両端が一対の駆動モータ16の回転軸に取り付けられており、この駆動モータ16で巻き取られることによって、スクレパー14をロール2、3に沿って摺動させる。駆動モータ16は、上下方向に可動な一対のフレーム17にそれぞれ固定されており、このフレーム17が上下動することによって、スクレパー14をロール2、3に対して昇降させて着脱させる。

【0028】このフレキシ印刷機1は、印刷作業中においては、アニロックスロール2とドクターロール3の間にインキ供給管4から常時インキが供給されている。この供給されたインキは、アニロックスロール2の回転速度よりわずかに遅い速度で逆方向に回転するドクターロール3により均一にアニロックスロール2へ付着され、このアニロックスロール2の表面からロール2と同じ速度で逆方向に回転する印刷シリンダ8の印版7に移転する。そして、このインキが移転した印版7に段ボールシートが走行しながら接触することによって、所定の印刷が行われるのである。この印刷作業中には、スクレパー

14は、フレーム17の上昇により常時ロール2、3から離隔された状態でロール2、3の駆動側端部上方に位置している。また、印刷作業中にインキがロール2、3両端からオーバーフローした場合は、このオーバーフローしたインキがエンドパン10から排出管11を通過してインキ容器に戻されて再び印刷に利用される。

【0029】一方、ある印刷作業が終了して次のインキへの色替えを行う必要が生じた場合は、図3のフローチャートに示す要領でロール2、3に付着したインキを回収する。この回収に必要なフレキシ印刷機1における一連の動作は、タイミングシーケンサにより一元的に制御される。

【0030】なお、色替え時には、アニロックスロール2はフリー回転する状態になり、ドクターロール3は印刷運転時より極めて低速度で駆動回転される状態になる。従って、アニロックスロール2はドクターロール3との接触によって低速度で回転することとなる。

【0031】まず、タイミングシーケンサに色替えによるインキの回収指令が発せられると(S₁)、このタイミングシーケンサがドクターロール3とアニロックスロール2を停止させる(S₂)。そして、フレーム17を下方へ移動することによりスクレパー14を下降させて(S₃)、このスクレパー14をロール2、3の駆動側端部の外周面に隙間なく押し付ける。

【0032】次いで、スクレパー14をロール2、3に押し付けた状態でロール2、3の図1の右側の駆動側(DR)から左側の操作側(OP)へ摺動させて(S₄)、ロール2、3の操作側端部で停止させて(S₅)、ロール2、3間に溜まったインキをエンドパン10へ掻き出す。この掻き出されたインキは、エンドパン10から排出管11を通過してインキ容器に回収される。そして、フレーム17を上方へ移動することによりスクレパー14を上昇させて(S₆)、スクレパー14をロール2、3から離隔させる。

【0033】この後、ドクターロール3及びアニロックスロール2を低速回転させながら(S₇)、計量ユニット12から供給管13の複数の供給口を通して200ccの水液をロール2、3間に点滴して(S₈)、ロール2、3表面からインキを除去する。除去されたインキは、点滴された水液で薄められてロール2、3間に溜まる。また同時に、スクレパー14をロール2、3から離隔させた状態で操作側から駆動側へ移動させて

(S₉)、ロール2、3の駆動側端部上方で停止させる(S₁₀)。

【0034】規定量の水液が、供給管13の複数の供給口から点滴されるので、水液がロール2、3の全幅にわたって均一かつ迅速に供給されるため、インキがロール2、3の外周面から短時間に効率よく除去される。

【0035】そして、ドクターロール3を停止させた(S₁₁)後、フレーム17を下方へ移動させて再びスク

レパー14をロール2、3の駆動側端部の外周面に押し付け(S₁₂)、このスクレパー14をロール2、3の駆動側端部から操作側端部へ再度摺動させて(S₁₃)、ロール2、3間に溜まった水液で希釈されたインキをエンドパン10へ掻き出し、スクレパー14をロール2、3の操作側端部に停止させる(S₁₄)。水液の点滴供給中およびスクレパー14による掻き出し中に、希釈インキは、エンドパン10から排出管11を通過してインキ容器へ回収される。このとき、エンドパン10及び排出管11の内面に付着したインキも同時に水液によって除去されて回収されるので、インキの回収量が增大するし、次色のインキに交換した場合にインキの色の混ざりがなく都合がよい。

【0036】なお、スクレパー14を駆動側から操作側へ摺動させて希釈インキを回収しているので、図1の実施形態の場合、回収される希釈インキの大部分が長い排出管11を経由することはないため、回収時間が短かくて済む。

【0037】点滴される水液の量は、インキの種類や粘度、またはロール2、3の大きさ等によって異なるが、ロール2、3表面や排出管11等のインキを除去して回収した場合に、回収したインキがインキ容器内で再利用可能な濃度になるように規定されており、除去したインキをインキ容器に戻しても問題がない。このようにして、残存するインキがほとんどなくなった後に、フレーム17を上方へ移動することによりスクレパー14を再び上昇させ(S₁₅)、ドクターロール3及びアニロックスロール2を回転させて洗浄工程へ移行する(S₁₆)。また同時に、上昇させたスクレパー14を操作側から駆動側へ移動させ(S₁₇)、ロール2、3の駆動側端部上方で停止させて(S₁₈)、次の操作に備える。

【0038】洗浄工程では、ロール2、3が回転している状態で電磁弁5が開放され給水管6からインキ供給管4に多量の水液が洗浄液として供給されて、インキ供給管4、ロール2、3、エンドパン10及び排出管11が洗浄される。このとき、インキ供給管4と排出管11の各下端部は、インキ容器から外されてバケットの上方に位置しており、洗浄に供された水液は、バケットに排出された後、廃棄処理されることとなる。

【0039】なお、規定量の水液を2度に分けて点滴供給して、インキを回収するようにしてもよい。この場合、(S₈)で水液を点滴供給中に(S₉)でスクレパーを上昇させたままで、そのスクレパー14を(S₉)で操作側(OP)から駆動側(DR)へ移動させるのではなく、スクレパー14を一旦下降させてから移動させることによって、一回目のインキ回収を行い、再度、同様に水液を点滴供給した後、スクレパー14の駆動側から操作側への移動を利用して二回目のインキ回収を行えばよい。

【0040】この際、スクレパー14は、ドクターロー

ル3及びアニロックスロー2の回転中には上昇され、摺動によるインキ回収中には下降される。

【0041】上記の【発明が解決しようとする課題】の欄で示した条件のロール2、3を使用して、この発明に係るフレキシ印刷機1の効果を試験したところ、ロール2、3の表面とエンドパン10及び排出管11の内面とに付着するインキを、ほとんど全て回収することができ、インキロスをはほぼ零近くにすることができた。

【0042】したがって、次に示すような条件で月当たりのコストダウンの額を算出すると以下ようになる。

1. 条件

(1) 図1に示すユニットを3ユニット備えている、3色まで同時に印刷できる3色フレキシ印刷機を使用する。

(2) 顧客の注文による段ボールシートに必要とする1回当たりの印刷の色数の平均を1.7色とする。

(3) 異なる印刷を施す1日当たりの頻度、すなわち色替回数を30回とする。

(4) 1ヶ月当たりの稼働日を22日とする。

(5) 従来のフレキシ印刷機における1日当たりのインキロス【発明が解決しようとする課題】の欄に記載)

① スクレーパーを使用しない場合：約540g

② スクレーパーを使用する場合：約150g

2. コストダウンの額（インキ単価を710円/kgとする。）

(1) スクレーパーを使用しない従来のフレキシ印刷機と比較した場合

$1.7(\text{色/回}) \times 30(\text{回}) \times 0.54(\text{kg}) \times 710(\text{円/kg}) \times 22(\text{日/月}) \div 43(\text{万円})$

(2) スクレーパーを使用する従来のフレキシ印刷機と比較した場合

$1.7(\text{色/回}) \times 30(\text{回}) \times 0.15(\text{kg}) \times 710(\text{円/kg}) \times 22(\text{日/月}) \div 12(\text{万円})$ 。

【0043】また、このフレキシ印刷機1は、インキ残量がほとんどないため、洗浄工程における洗浄に供する水液の量と洗浄時間を低減することができる。この点からも、コストダウンが図れるのである。

【0044】この実施の形態では、洗浄液としての水液と希釈液としての水液とを同一の給水管から供給することとしたが、それぞれに別個の給液機構を設けて互いに独自に洗浄液と希釈液を供給するようにしてもよい。

【0045】また、ロール2、3間に溜まるインキ又は希釈されたインキの回収は、上記スクレーパー14によるものの他、ロール2、3の上方位置に送風部を下方へ向けた送風管を配置し、送風口からの風圧によりインキを

排出させる方法、排出管11に負圧機構を設け、その吸引力を利用してインキを排出する方法等、任意の手段を用いることができる。

【0046】

【効果】この発明に係る印刷機とインキの回収方法は、以上のように構成されていることより、インキロスを従来に比べて著しく低減させることができるので、印刷にかかるコストの削減に大きく貢献することができる。

【0047】また、廃液による公害の防止および廃液処理のための装置と費用の削減を図ることもできる。

【0048】さらに、スクレーパーを設けてインキを回収する場合には、インキ回収の効率がより向上する。

【0049】そして、希釈液の供給手段が複数の供給口を備えている場合には、インキ回収が短時間に効率よく行える。

【図面の簡単な説明】

【図1】この発明のフレキシ印刷機の実施の一形態を示す要部斜視図

【図2】ローラ部分のその端面からの側面図

【図3】この発明のインキ回収方法を示すフローチャート

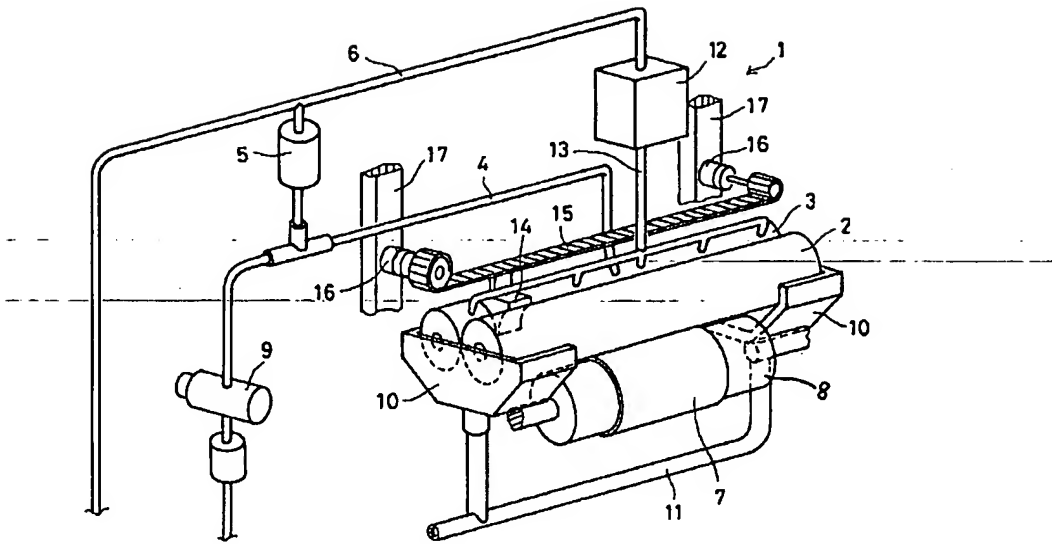
【図4】従来のフレキシ印刷機の斜視図

【図5】インキ残量を示す側面図

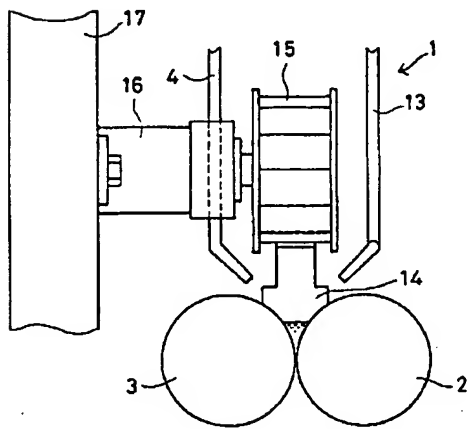
【符号の説明】

- 1 フレキシ印刷機
- 2 アニロックスロー
- 3 ドクターロール
- 4 インキ供給管
- 5 電磁弁
- 6、22 給水管
- 7 印版
- 8 印刷シリンダ
- 9 ポンプ
- 10 エンドパン
- 11 排出管
- 12 計量ユニット
- 13 供給管
- 14 スクレーパー
- 15 フラットベルト
- 16 駆動モータ
- 17 フレーム
- 20 従来のフレキシ印刷機
- 21、21' インキ容器
- 23 パケット

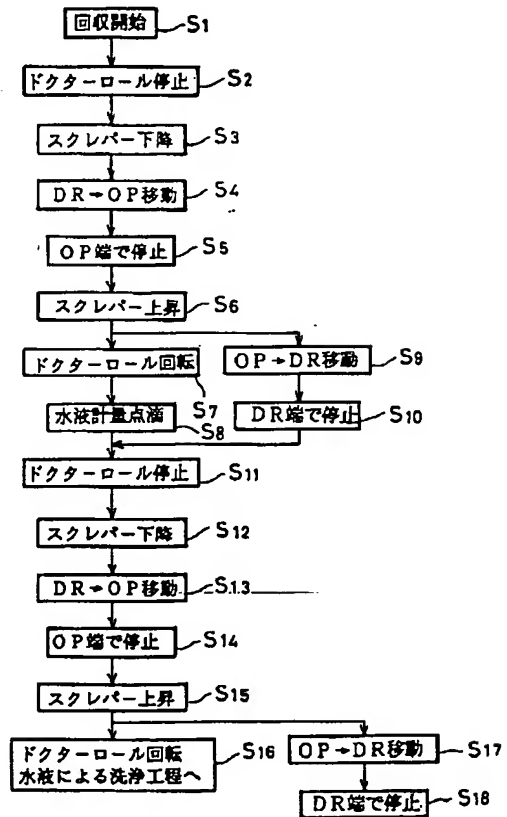
【図1】



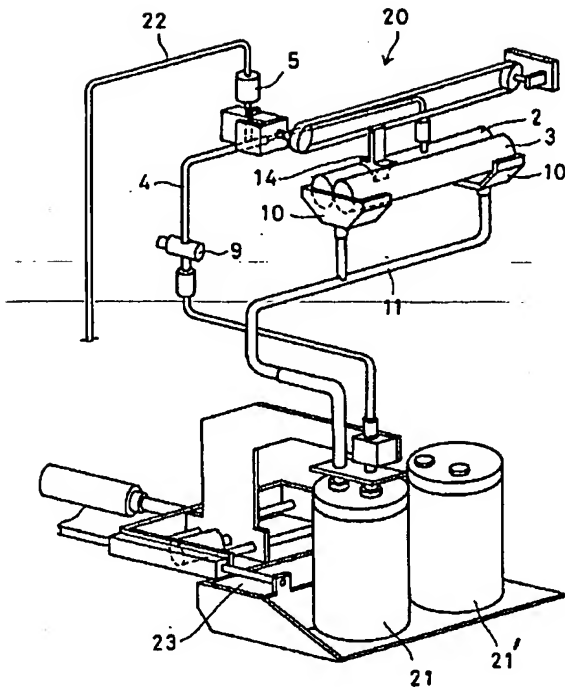
【図2】



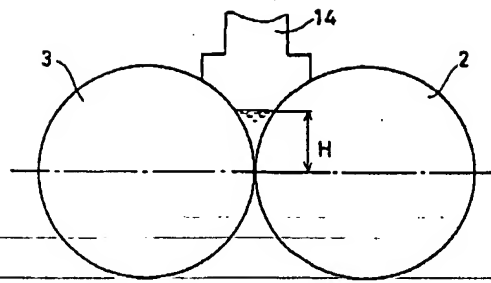
【図3】



【図4】



【図5】



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